El Salvador - Water and Sanitation

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Overview

Identification

COUNTRY
El Salvador

EVALUATION TITLE
Water and Sanitation

EVALUATION TYPE
Independent Impact Evaluation

ID NUMBER
DDI-MCC-SLV-WASH-2014-v01

Overview

ABSTRACT
The benefits of the water and sanitation sub activity will be measured using a rigorous quasi-experimental impact evaluation methodology. An impact evaluation is a study that measures the changes in outcomes that measure aspects of wellbeing which can be attributed to a specific intervention. Impact evaluations require a credible and rigorously defined counterfactual, which estimates what would have happened to the beneficiaries absent the project. Estimated impacts, when contrasted with total related costs, provide an assessment of the intervention's cost-effectiveness.

The evaluator divided the primary evaluation questions in different categories: welfare indicators, coping cost in cash and time, health, education, reliability and quality of service, spillover effects. In addition, we allow for differential impacts in gender and social groups for these main outcomes.

Household welfare

o Do water and sanitation infrastructure investments increase household expenditure or income? What factors might explain the impact (or lack of impact) in this area?

o What are the consequences of water and sanitation investments for expenditure patterns?

Coping costs and cash expenditure on water

o Do water and sanitation interventions reduce coping costs? What factors might explain the impact (or lack of impact) in this area?

o Do they reduce cash expenditures on water and on sanitation services? What factors might explain the impact (or lack of impact) in this area?

Health

o Do water and sanitation interventions reduce incidence of diarrheal illness?

o What factors (hygiene behavior, source and household-level water quality, household source choice) might explain the impact (or lack of impact) in this area?

Education

o Do water and sanitation interventions increase school enrollment among children aged 7 to 12? And children age 6 to 18? What factors might explain the impact (or lack of impact) in this area?

o Do water and sanitation interventions increase school attendance among children aged 7 to 12? And children age 6 to 18? What factors might explain the impact (or lack of impact) in this area?

Service, use, and sustainability

o Were the water and sanitation projects implemented according to plan?

o Are the results from the activity expected to be sustained over time?

o Did the MCC investment reach intended/unintended beneficiaries?

Gender and social exclusion

o Do the effect on health, education and access of water and sanitation interventions differ by gender or by expenditure levels (initial conditions)?

o What factors (hygiene behavior, source and household-level water quality, household source choice) might explain the impact (or lack of impact) in a specific subpopulation?

The key to measuring the impacts caused by the water and sanitation interventions is to compare conditions with the interventions to conditions that would have prevailed without them. The counterfactual state is not naturally observable - we can never know what change would have occurred in program participants (the treatment group) if the program were not implemented. As it was not possible to apply randomization in the selection of water and sanitation projects in this case, the benefits of the water and sanitation projects will be measured with a rigorous quasi-experimental design that incorporates matching, pre- and post-implementation data collection, difference-in-difference estimation, and econometric analysis to estimate the counterfactual and address selection and other biases. This requires selecting a comparison group-households that are observationally similar to beneficiary households but do not participate in the program-and observing both sets of households before and after the program is implemented.

Matching represents a credible non-experimental option for identifying comparison groups. The evaluator uses propensity score matching (PSM) using data from the 2007 census to match the treatment communities to comparable communities before program implementation. PSM identifies comparison communities that have a similar probability of receiving the treatment and are similar to the treatment communities in terms of observable characteristics. Accordingly, they provide measures of indicators in communities that are similar except for the treatment; thus addressing selection on observables.

EVALUATION METHODOLOGY
Propensity Score Matching

UNITS OF ANALYSIS
Census segments, households, individuals

KIND OF DATA
Sample survey data [ssd]

TOPICS

Topic	Vocabulary	URI
El Salvador		
WASH		
water		
sanitation		
impact evaluation		
PSM		
matching		
Gender		

KEYWORDS
El Salvador, WASH, water, sanitation, impact evaluation, PSM, matching

Coverage

GEOGRAPHIC COVERAGE

The survey was administered in the El Salvador Northern Zone departments of Cabañas, Chalatenango, Cuscatlán, La Unión, Morazán, San Miguel and Santa Ana.

UNIVERSE
Sixty-two municipalities in the Northern Zone, classified as either “Extrema Pobreza Moderada” or “Extrema Pobreza Alta” (extreme moderate poverty or extreme high poverty, respectively) by the national poverty map, were invited to submit proposals for water and sanitation projects. To be considered eligible for the program, the proposals had to meet four criteria: (1) the municipality had to be eligible to participate, meaning there were classified as high or moderate extreme poverty; (2) both the community and municipality had to be willing to make a financial/labor commitment to the project, (3) the community had to be organized and willing to work with the municipality, and (4) the estimated cost of the project could not exceed $850 per beneficiary. After projects that did not meet the eligibility criteria were excluded, a list of 68 projects remained. These were cleared to enter the feasibility stage. Comparisons segments were selected from non-beneficiary segments that where eligible to participate taking into account the poverty map, an proxies for financial capacity of the municipality and community involvement where included in the propensity score estimation.

Producers and Sponsors

PRIMARY INVESTIGATOR(S)

Name	Affiliation
Social Impact	

FUNDING

Name	Abbreviation	Role
Millennium Challenge Corporation	MCC	

Metadata Production

METADATA PRODUCED BY

Name	Abbreviation	Affiliation	Role
Millennium Challenge Corporation	MCC		Review of Metadata

DATE OF METADATA PRODUCTION
2014-09

DDI DOCUMENT VERSION
Version 1 (2014-08-20)

Version 1.1 (2014-09-09): Added survey team description and survey implementer information

DDI DOCUMENT ID
DDI-MCC-SLV-WASH-2014-v01

MCC Compact and Program

COMPACT OR THRESHOLD
El Salvador Compact I

PROGRAM
The El Salvador Compact entered into force in September 2007 and ended in September 2012. The Compact consisted of three Projects with the collective goal of stimulating economic growth and reduce poverty: Productive Development ($68 million); Human Development ($89 million) and Connectivity ($269 million). The Human Development Project consisted of two Activities, the Education and Training Activity (28.7 million) and the Community Development Activity (60.3 million). The Community Development Activity consisted of three Sub-Activities: Rural Electrification Sub-Activity (31 million) , Community Infrastructure Sub-Activity (11.7 million) and Water and Sanitation Sub-Activity (17.6 million). The Water and Sanitation Sub-Activity consisted of the construction of 45 potable water and sanitation systems, technical assistance for community capacity building to ensure system maintenance and sustainability, and community education related to appropriate health and sanitation practices. Initially the water projects would involve providing water to households that did not previously have

improved services. However, the project application, selection process, and feasibility studies generated a more diverse set of projects. Twenty-five of the projects installed water in communities that did not previously have improved water services. The remaining twenty projects extend an existing water system to additional households, improved an existing system, or both improved and extended an existing deficient system. The projects consisted of 272,151 meters of pipes that connect 26 wells and 19 water sources to an estimated 32,929 beneficiaries with 7,624 new metered household tap connections providing access to new/improved water distribution systems. In addition, 15 community taps where constructed.
Forty-three of the projects include the construction/improvement of composting or improved-hole latrines construction. This part of the WSS built 1,702 composting latrines, 108 composting latrines and repaired 212 latrines in the households that were to be connected to the water system. Forty-four of the projects include the construction of grease-traps to dispose of gray waters. In total 7,142 new grease traps were constructed.

MCC SECTOR
Water, Sanitation and Hygiene (WASH)

PROGRAM LOGIC
The goal of the Water and Sanitation Sub-Activity (WSS) was to enhance access to water systems and to improve sanitation services to the poorest inhabitants of the Northern Zone of El Salvador. The component was designed to provide piped water or (in a few cases) public taps for households that previously did not have access to this level of service and latrines to all water project participants who did not already have improved sanitation. The impacts on the well-being of the beneficiaries that the MCC expects the water and sanitation interventions to have are: • Increase household income/consumption by at least 15%; · Increased potable water consumption to 177 liters per person per day; • Reduce morbidity from water-related illnesses, for example reducing diarrhea rates from 8.5% to 0%; and, • Reduce the time and cost spent on seeking or purchasing water, for example reducing average time collecting water from 4.58 hours per week per household to 0 hours per week per household, and the cost of water from 1.68 $ per cubic meter to 0.43$ per cubic meter. Other potential impacts of the WSS included improvements in education, measured as attendance and enrollment of children originating from decreased coping cost of carrying water an doing laundry outside the home and the decreased incidence of water-borne diseases; impact heterogeneity across gender and socio-economic status will be explored. The project will offer benefits in terms of reduced incidence of disease caused by the currently sub-standard levels of water and sanitation service in the region. For example the baseline survey shows that around 45 percent of the households in the treatment segments use untreated water sources like wells and springs to obtain water and over 40 percent have unimproved sanitary services, namely nonexistent, communal and hole latrines. Beneficiaries gain time savings by removing the need to fetch water and cost savings by removing the need to buy water from more expensive sources. These benefits are expected to have positive effects on household incomes in the region. In addition, reduced mortality and morbidity entail specific benefits like reduced expenditures on healthcare, and potential labor productivity gains from increased attendance to school and work.

PROGRAM PARTICIPANTS
Sixty-two municipalities in the Northern Zone, classified as either extreme moderate poverty or extreme high poverty by the national poverty map, were invited to submit proposals for water and sanitation projects. To be considered eligible for the program, the proposals had to meet four criteria: (1) the municipality had to be classified as either extreme moderate poverty or extreme high poverty, (2) both the community and municipality had to be willing to make a financial commitment to the project, (3) the community had to be organized and willing to work with the municipality, and (4) the estimated cost of the project could not exceed $850 per beneficiary.

Sampling

Study Population

Sixty-two municipalities in the Northern Zone, classified as either “Extrema Pobreza Moderada” or “Extrema Pobreza Alta” (extreme moderate poverty or extreme high poverty, respectively) by the national poverty map, were invited to submit proposals for water and sanitation projects. To be considered eligible for the program, the proposals had to meet four criteria: (1) the municipality had to be eligible to participate, meaning there were classified as high or moderate extreme poverty; (2) both the community and municipality had to be willing to make a financial/labor commitment to the project, (3) the community had to be organized and willing to work with the municipality, and (4) the estimated cost of the project could not exceed $850 per beneficiary. After projects that did not meet the eligibility criteria were excluded, a list of 68 projects remained. These were cleared to enter the feasibility stage. Comparisons segments were selected from non-beneficiary segments that where eligible to participate taking into account the poverty map, an proxies for financial capacity of the municipality and community involvement where included in the propensity score estimation.

Sampling Procedure

In 2009, the evaluator recommended 18 observations per cluster and 164 communities, while adding an additional contingency -- 6 extra treatment segments and 6 extra control segments, for a total of 216 additional households in order to provide extra cushion for the loss of projects during implementation or inaccuracies in the sample frame. The final sample size for recommended for the study was 3,168, with 88 comparison and 88 treatment segments, each with 18 households.

However, in 2011, given changes to program design and required revisions to power calculations, the evaluator ultimately collected baseline data on 3,284 households, with 65 segments in both treatment and control and an average of 24-27 households per segment.

Response Rate

94.5% for 2012 survey
96% for 2013 survey

Questionnaires

Overview

The household level survey is administered in the departments of Cabañas, Chalatenango, Cuscatlán, La Unión, Morazán, San Miguel and Santa Ana. The survey is composed of a set of sections to characterize the water access situation of households, household demographics, consumption, income/productive activities and time allocation of women and children.

The community level survey includes 130 census segments representing 196 caseríos. The information is obtained from interviews of key informants from the communities. Key informants include health workers/promoters, members of the water boards and other community leaders.

Data Collection

Data Collection Dates

Start	End	Cycle

Questionnaires

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Data Collectors

Name	Abbreviation	Affiliation
Dirección General de Estadísticas y Censos	DIGESTYC	

Supervision

Interviewing was conducted by teams of interviewers. Each interviewing team comprised of 3-4 interviewers, and a supervisor, and a driver.

The role of the supervisor was to coordinate field data collection activities, including management of the field teams, supplies and equipment, finances, maps and listings, coordinate with local authorities concerning the survey plan and make arrangements for accommodation and travel. Additionally, a chief field supervisor assigned the work to the supervisors/interviewers, spot checked work, maintained field control documents, and sent completed questionnaires and progress reports to the central office.

The team 2 coordinators for data entry and quality control that were responsible for managing the headquarter team reviewing each questionnaire, checking for missed questions, skip errors, fields incorrectly completed, and checking for inconsistencies in the data.

Data Processing

No content available

Data Appraisal

No content available